

ABSTRACT

According to the process, a heap preferably having dimensions of at least 2.5 m high and 5 m wide is constructed with hypogenic copper sulfide bearing ore. The constructed heap includes exposed sulfide mineral particles at least 25 weight % of which are hypogenic copper sulfides. The concentration of the exposed sulfide mineral particles in the heap is such that the heap includes at least 10 Kg of exposed sulfide sulfur per tonne of solids in the heap. Furthermore, at least 50% of the total copper in the heap is in the form of hypogenic copper sulfides. A substantial portion of the heap is then heated to a temperature of at least 50°C. The heap is inoculated with a culture including at least one strain of thermophilic microorganisms capable of bioleaching sulfide minerals at a temperature above 50°C. A process leach solution that includes sulfuric acid and ferric iron is applied to the heap. Bioleaching is carried out so that sufficient sulfide mineral particles in the heap are biooxidized to oxidize at least 10 Kg of sulfide sulfur per tonne of solids in the heap and to cause the dissolution of at least 50% of the copper in the heap into the process leach solution in a period of 210 days or less from completion of the heap. A pregnant process leach solution that contains dissolved copper is collected from the heap as it drains from the heap. Copper may then be recovered from the pregnant process leach solution.

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